Composite Bridges Going Forward

Also in this issue:
Up-and-Coming Turbines | Online Exclusives
Putting the Power of Closed Mold to Work for You

For years, manufacturers have struggled with making the transition to closed mold processes that can help them build parts, better, faster, with less waste and fewer emissions.

We have the solution – the Closed Mold Alliance. Comprised of closed mold professionals with the experience, knowledge, training, molds, equipment and materials you need, the Alliance offers turnkey solutions and vast resources. Everything you need to make a seamless transition to closed mold.

Find out what the Closed Mold Alliance can do for you. Visit www.closedmoldalliance.com, or call 1-800-621-8003.

LIVE AT IBEX: Watch Composites One, Magnum Venus Plastech and the Closed Mold Alliance demo the latest advancements in Lean Mean Closed Mold technologies, September 28-30. For info, visit IBEX Booth #1527, compositesone.com or closedmoldalliance.com.
Composite Bridges Going Forward
Composites professionals have worked for decades to attain wider adoption by departments of transportation and civil engineers. So where do things currently stand? Here are the five things you need to know.
By A. Mike Shuler

Up-and-Coming Turbines
The biggest problem with wind turbines is that there aren’t enough of them. That and they’re not perfect—yet. Five up-and-coming turbines represent potential breakthroughs in efficiency, quality, reliability and cost, and composites play a key role.
By Melinda Skea

Dispatches from the Jamboree
ACMA member volunteers traveled to Fort AP Hill for the National Scout Jamboree in August, where they helped eager scouts earn the composites merit badge.

Online Exclusives
Composites are everywhere. So is Composites Manufacturing. Visit www.compositesmanufacturingblog.com for exclusive content, including Q&As with industry leaders, new product round-ups and up-to-date news.
President's Message

By Monty Felix

You Make The Difference

Before my wife Juanita and I bought Alaglas Pools in 1999, I was President/COO of a very large regional waste management (garbage) company headquartered in North Carolina. I owned and operated more than 400 hauling trucks along with a good number of transfer stations and landfills throughout the southeastern United States. Like most of you, I pretty much spent all my time running the business and saw no great value in getting involved with my local political delegation. I wasn’t even a member of our association. Then one day all that changed.

I owned a small landfill in South Carolina and would pick up garbage from North Carolina sites and transport them south. It was cheaper to dispose of the waste in my own landfill ($18/ton) than to dispose of it at the new county-owned incineration facilities ($74/ton – a 400 percent increase in my disposal costs).

This new facility had been funded through a local bond initiative, which obligated the county to make fixed payments, all of which depended on the revenue collected at the incinerator. Needless to say, not much garbage went to the incinerator because it was too expensive. So one county enacted a law stipulating that all waste collected within that county had to be sent to the incinerator. I was furious and thought this just another attack on private enterprise by an overreaching government—it had become personal.

I looked for support and found (and joined) the National Solid Waste Management Association, because there were a bunch of us throughout the United States that ran into the same challenge. The association had more leverage to do something about this issue than I had by myself, so I needed to be a part of their collective effort. But I didn’t stop there. I sought out my congressman and asked for her help on a federal basis by pointing out that the county laws were an infringement on my right not to be encumbered in the interstate movement of goods—in this case garbage. I even testified before the Congressional Small Business Committee in Washington, D.C. In the end, the counties rescinded the laws, and we got back to the business of hauling garbage. At that time, there were more than 14,000 haulers, the overwhelming majority of whom were small businesses.

Why is this story important to you? All of us in the composites industry are in a real battle concerning one singular issue—styrene. Our raw materials contain styrene, and without it we would not be able to produce high-quality products. And styrene is not going away. The preponderance of studies conducted throughout the world has concluded that there is not a definitive link between styrene exposure and cancer.

You would think that results from good scientific analyses would be enough to put this issue to rest. Unfortunately, our industry continues to be attacked by those who will not recognize good scientific evidence, for whatever motives they may have. And unless we collectively do something about this assault on our industry, you and I will not survive as businesses.

If you have not already done so, I ask that you join your association and help fund our collective defense. Also, enlist your congressional delegations in providing additional leverage. It is time to make a commitment and take a stand. Your efforts can and will make a difference, but you must move quickly. If you don’t, we’ll most certainly pay a steep price.

Monty Felix
Alaglas Pools, ACMA President
monty@alaglass.com; 803-655-5000
CCP has the right material for your Composites application.

- **Epovia®** Vinyl Ester state-of-the-art resins offer outstanding resistance to acids, alkalis, solvents and other corrosive materials, even at elevated temperatures.

- **OptiPLUS®** mold-making system is simply one of the fastest and easiest methods for fabricating thermoset and thermoforming molds available in the market today.

- **ThermaCLEAN®** products provide greener solutions and have significant advantages over acetone in terms of emissions and fire safety.

- **NuTack®-Blu** is a reactive tackifier used in closed molding that chemically reacts with resin, resulting in inter-laminar adhesion.

NuTack®-BLU, Epovia®, OptiPLUS® and ThermaCLEAN® are registered trademarks of Cook Composites & Polymers. © 2009
For industrial use and professional applications only. Contact the CCP Web site for complete product information.
Aerospace

Start-Up Wants Airlines to Swap Copper with Nanotubes

Just five years ago, Concord, New Hampshire-based Nanocomp Technologies was a budding company branching from technology development company Synergy Innovations. The company, started by Peter Antoinette and Dave Lashmore, began making long, individual carbon nanotubes and fashioning them into yarn and sheet material for various segments within the composites industry.

“We began as a typical start-up. I had the business background and Dave had the technical background and was full of ideas,” says CEO Peter Antoinette. “We started with just the two of us and now we’ve built it up to 35 people.” The small company started with the idea to create specific nanotube-based components that engineers could use, instead of producing bulk product. That way, according to Antoinette, the customer can use the product more quickly. “For example, a customer doesn’t have to worry about how to integrate the nanotube sheet because we are able to pre-preg resin right into it,” he says.

The pair first focused their attention on carbon yarn. Although the process is proprietary, Antoinette says the grown, harvested and furnace-spun nanotubes are different because the company is pushing the scale of how long the yarn can be, yet still retain the same characteristics found at the nanoscale. “We go from fuel to nanotube to yarn or sheet in one apparatus,” he says.

Nanocomp believes this product will be valuable in applications such as replacing copper wire. “The yarn is 90 percent lighter than copper,” explains Antoinette. “On an aircraft like the Boeing 787 there are 61 miles of cable; if we can replace that wire it will reduce the aircraft payload more than 1,000 pounds – that’s a big savings factor. Also, one-third of a satellite’s weight is copper. We see composite yarn as a 21st century solution to an ongoing aerospace challenge.”

However, the men found that a 3x6 or 4x8 sheet material they were producing was more valuable, being electrical and thermally conductive, similar to a nonwoven composite. “Right now, EMI shielding panels are a huge market within aerospace,” says Antoinette. “We’re also working with the Army on a type of body armor. With a 2 millimeter-thick sheet, we can stop a bullet. However, it’s tough to implement until we get to a larger scale. We’ve recently moved from research to qualification and our next step is to move into a plant where we can turn-up the production scale.”

For such a small, upstart company, Nanocomp is finding success. “We go to targeted conferences in order to get in front of industry representatives,” explains Antoinette. “We found ways to make our story appealing from the get-go. I look at it like speed dating: I get five minutes to give a pitch and if they like it, I get another meeting. It’s incremental, but it’s working.”
In April, the U.S. Department of Transportation (DOT) and the U.S. Environmental Protection Agency (EPA) jointly established new federal rules that set the first-ever national greenhouse gas (GHG) emissions standards for all new passenger cars and light trucks sold in the United States. The rules, which will significantly increase the fuel economy of the vehicles starting with the 2012 model year, will conserve about 1.8 billion barrels of oil, and reduce nearly a billion tons of GHG emissions over the lives of the vehicles covered and give lightweighting composites an opportunity to shine.

The final rules, issued by DOT’s National Highway Traffic Safety Administration (NHTSA) and EPA, establish increasingly stringent fuel economy standards under NHTSA’s Corporate Average Fuel Economy program and GHG emission standards under the Clean Air Act for vehicles produced in model years 2012 through 2016.

Starting with 2012 model year vehicles, the rules require automakers to improve fleet-wide fuel economy and reduce fleet-wide GHG emissions by approximately five percent every year. NHTSA has established fuel economy standards that strengthen each year, reaching an estimated 34.1 miles per gallon by 2016.

So what exactly does this mean for composites? A greater focus on fuel economy brings lightweighting to the forefront. With an oft-cited advantage of composites being a lighter alternative to substances such as metal, it only seems natural that composites emerge as a prime option to meet this directive.

John Schweitzer, senior director of government affairs for the American Composites Manufacturers Association (ACMA) says there’s a vehicle technology program at DOE that has a list of technologies for applications like hybrid engines and alternative fuel vehicles. “The problem is, it skips over glass composite materials and goes on to things like carbon nanotubes, lignum and magnesium. I think composites should be in that mix, but they’re not, even though they can offer a significant improve-

Emissions Rules Take Effect
ment in fuel economy through weight reduction.”

However, Jim deVries, manager of the manufacturing research department at Ford Research Laboratories, said in an October 2009 interview with Composites Manufacturing that conventional composites alone may not be enough. “Glass composites do not achieve the weight savings created in aluminum and magnesium, so I think the composites industry must look towards alternative reinforcements, ways to make conventional composites more lightweight.”

Which Fibers Win Out?
Carbon fiber represents a more commonplace solution to the lightweighting issue. “We see more emphasis on carbon fiber,” said Hamid Kia, group manager for polymer composites at General Motors in a February 2010 interview with Composites Manufacturing. “The dollar-per-pound saved related to mass savings is going up because companies are more willing to pay more up front.”

The problem is that the material has always been too expensive. “Carbon fiber may be the next big composite material for the automotive industries, but for that to occur, the price of carbon fiber has to go down,” says deVries.

Natural fibers such as flax and hemp could play a larger role in achieving these standards, and composites are fully capable of being involved. “The need for renewable sources has been driving more emphasis on natural fiber and developing composites,” says Kia.

“This material is strong in its natural form and is rapidly renewing. It plays right into the green initiative that’s emerging,” says Mark Townsley, ground transportation engineer at the Composites Innovation Centre (CIC) in Winnipeg, Canada. CIC has an internal program of commercializing hemp bio-fibers, and the institution is hard at work on developing parts to meet this need.

Last December, CIC started work on a natural fiber battery door for a J4500 motor coach. Townsley, had worked at Motor coach Industries for over a decade and worked with them on manufacturing the product using a typical sandwich construction in a light RTM mold.

As one might expect with an emerging building material, there were challenges. “In the first tests, the permeability wasn’t as good as we wanted,” says Townsley. “We did mechanical and flex sandwich testing of the pure hemp material and found it wasn’t great when compared to glass. We went back and combined some glass fiber with it and managed to get some good parts using that technique, so we used the hybrid lay-up for the door.”

So far, the bio-materials are slightly heavier than fiberglass (about two percent). The material itself is lighter, but becomes heavier because it tends to soak up resin. “As we design the mats to become more permeable in the closed molding form, we hope to tailor it to weigh less than glass,” says Townsley.

Thanks in part to Townsley’s past employment, CIC has good connections with all local ground transportation manufacturers. “Transportation companies are keen on using the green products. It’s more important to people than many realize. It didn’t take much convincing to actually try them. Everybody’s game to try new things,” he says.

Of course, anyone can try something, but real-world adoption is a different matter. “There can be a lot of excitement generated in bio-based materials but in doing so, there is a lot of work that needs to be done to make these compatible with the automotive environment, whether it is humidity or heat or so forth,” says deVries.

For its part, CIC is also concerned about cost as they attempt to commercialize natural fibers on a global scale. “If it doesn’t compete price-wise to existing materials, we have to make sure it does,” says Townsley. “We’re very cognizant of what we have to do. Our stuff is being done on prototype lines and experimental lines, so it is more expensive now. These are low-quality experimental runs right now, but I have every confidence that they’ll cost less, especially with the rise of fuel costs to process existing materials. Those and transportation costs will factor into the lower costs.”

Projects like CIC’s bus cover are just the first step on the auto industry’s path to achieve better fuel economy. Lightweighting is a straightforward method in accomplishing that goal, and composites companies may do well to jump on the idea now and connect their product with that concept.
High Performance Materials.

MULTIAXIALS
CLOSED MOULD REINFORCEMENTS
SELF ADHESIVE FABRICS
KITTED-FABRICS
PREFORMS
COMPOSITE PARTS

WIND ENERGY

BOAT AND SHIPBUILDING
RAILWAY
AUTOMOTIVE
AEROSPACE
PIPE RELINING
CIVIL ENGINEERING
RECREATION

www.saertex.com

SAERTEX USA
E-Mail: info.usa@saertex.com

SAERTEX France
E-Mail: info.france@saertex.com

SAERTEX Stade, Germany
E-Mail: info.stade@saertex.com

SAERTEX Portugal
E-Mail: info.portugal@saertex.com

SAERTEX South Africa
E-Mail: info.za@saertex.com

SAERTEX India
E-Mail: info.india@saertex.com

SAERTEX China
E-Mail: info.china@saertex.com
Many meetings are structured to talk at attendees — listen to this keynote speaker, pay attention to this presentation, follow these steps — but a recent gathering of ICPA professionals showcased the importance of talking with each other instead.

Business leaders in the cast polymer niche face similar economic concerns and regulatory pressures, but each company has distinct goals, questions and customers. So when about 70 of those leaders met at the ICPA Multi-Regional Meeting, held June 24 at Ashland Performance Materials in Dublin, Ohio, and June 25 at Heritage Marble of Ohio Inc. in nearby Columbus, it was an ideal opportunity to trade ideas and strategies that could literally mean business.

Sixty of those ideas were presented in swift fashion during the educational session “60 Tips in 60 Minutes,” presented by Ken Lipovsky, CCT-I, a technical service specialist at Reichhold Inc., Durham, N.C., and a member of the ICPA Technical Committee.

Many people who attended the session took brisk notes as Lipovsky presented tips he had culled from ICPA members prior to the meeting. Some tips were specific and targeted, like Gary Whiting’s of Tiffany Marble Inc.: “To remove end splashes from the mold without damaging the mold, take a 3⁄4” x 3⁄4” x 18” polyethylene divider bar and a floating bowl hold-down suction cup, and attach to the divider bar using a bolt. Drill a hole through the divider bar and suction cup, 5” from the end of the bar. Attach the suction cup to the bar using the bolt. Smack the back side of the end splash with the suction cup, pry up using the 5” end of the divider bar resting on the mold, and remove the end splash.” Other tips were quick and succinct, like Bern Brody’s of Interplastics: “The proper spray granite thickness is 35 mils.”

Larry Kraft of Custom Marble, Millstadt, Ill., mentioned that he noticed one area of his shop had a “huge styrene concentration at the outflow end of its gel oven.” Feeling others might face the same issue in the future, he shared this solution of enclosing the end of the oven below the rails, placing vents in the side of the oven at floor level, and connecting the vents to the spray booth plenum. “We don’t have engineering studies to document the reduction, but my nose tells me we do have a reduction,” he said, adding that the effect on the spray booth efficiency was negligible.

During other sessions at the Multi-Regional Meeting, many attendee questions were discussed, debated and dissected: Will styrene really be declared a cancer-causing chemical? What “profit drains” are most preventable? What causes “edge peel” and how do you prevent it? How can manufacturers vary techniques to develop more differentiated products? The event also included an impressive lineup of new-product presentations.

Richard Higgins, CCT-I, president of HK Research Corporation, presented a well-attended legislative update that focused on the current status of styrene and recent legislation on lead-based paint. Among other insight, he discussed ACMA’s legislative advocacy and its partnership with member firms in the San Francisco area to educate local regulators on “effective, feasible methods” of controlling styrene emissions. Higgins also outlined specific ways attendees could avoid combustible-dust citations and fines levied by OSHA and NFPA.

The meeting’s educational value is one reason Toby Tyler, president of Marble Works Inc., South Elgin, Ill., attended. “I could either take a proactive approach to my business by attending, or take a reactive approach to my competition, who attended while I stayed home,” he said.

John Webster, CCT-CP, president of Monroe Industries Inc., Avon, N.Y., said, “Attending these meetings shows one’s continued support and commitment to our industry, regardless of the many financial obstacles we face.” He and his wife Bonnie, who is on the ICPA Board of Advisors, brought two of the firm’s employees to the meeting as well. “Anytime you can accomplish this many things in a couple of days in one location, it’s a win/win. You have meetings, presentations, a shop tour, demos — wow! We need meetings like this a couple of times a year to learn and recharge our batteries.”
People at Owens Corning have continually used their knowledge of materials to develop new applications and markets for composites. Today, our industry-leading portfolio of specialty reinforcements includes Advantex® boron-free E-CR glass fibers, Cem-FIL® alkali-resistant glass fibers, Twintex® co-mingled glass and thermoplastic reinforcements, ShieldStrand® and FliteStrand® for ballistics and aerospace, TruPave® engineered paving mat and Silentex® material for effective exhaust noise control. These products and others are unlocking new application possibilities for extremely corrosive environments, lighter and stronger solutions, and products that save energy, reduce cost and improve productivity. They are key to expanding the use of composites for years to come.

Meet us at China Composites, Beijing, Sept. 15-17, Booth #502-601
Retrofit Market Props Fiberglass Panel Co.

The decline in new building construction has hurt Dipcraft Manufacturing’s fiberglass panel business, but the company believes retrofitting will help through the tough times. “Many of the buildings that need repair feature panels that were manufactured decades ago. Those companies are now out of business, and because we can implement a variety of shapes in the panel design, that’s a niche we believe we can fill,” says Michael Tobias, president.

Retrofitting is most common in older factories that were built with a large number of glass windows. “The glass tends to break and is costly to replace. We sell the owners large fiberglass sheets that go across the existing windows and cover them. It lets light in without replacing the glass planes,” says Tobias. The sheets are applied only on the outside, and while this doesn’t repair the glass, the benefits are cosmetic. “It makes the building look a lot better because the material still lets light in, but you won’t see the broken panes behind it. It’s like an insulation barrier.”

The panels are a composite of a fiberglass mesh, which is usually a chopped strand and woven cloth, embedded in a polyester resin base. The panels are manufactured in a process similar to continuous casting; they come through a series of dyes and the mat is chopped into the resin, which is then heated. It’s set and a chemical process hardens the panels that come down the line into a particular shape depending on the tooling. The panels are then cut to length as they go down the line.

Generally speaking, FRP panels aren’t necessarily meant to replace metal or vice versa. “Both materials have their place, and they’re not interchangeable,” says Tobias. “It’s very common for FRP panels to nestle with metal; a lot of our panels are designed with that in mind.”

Dipcraft is a small business, catering to many customers via phone who want to either nestle existing panel beneath window panes or want to replace the panes entirely. “Whatever situation they ask for, we email them...
some pictures of existing jobs so they get ideas on how to do it,” says Tobias.

Certain elemental factors also play a part in how the panel will be manufactured. Because panels can be made in different weights and profiles, some are stronger by virtue of the geometry of the panel. Weather is also a factor, as the panels are made differently depending on the climate. “There are considerations depending on the grade of the panel: the heavier the panel, the longer it’ll last in the field,” says Tobias.

It is important for all of these details to be ironed out early in the process because of the sheer number of loads Dipcraft sends to the facilities. If something is wrong, that’s a huge setback. “If they’re trying to nestle an existing panel, they’ll have problems with leakage if the overlaps aren’t done properly,” Tobias notes. The shape is the toughest item to figure out, and Dipcraft often requires facility owners to send a piece of existing panel, a drawing or a photo.

DipCraft says its FRP siding is being used in more retrofitting projects.
Piggybacking on the green move-
ment, Minneapolis-based VAST En-
terprises is carving out a niche in
what they describe as composite ma-
sonry, or building structures solely
from laying in individual units.
Founded in 2006, the firm uses com-
posite pavers to replace concrete in
landscaping, parking lots, driveways
and patios.
Though the company is new, the
technology is several years old and
involves precision plastics from the
automotive industry. CEO Andy V an-
der Woude had been working with
concrete pavers when composite
lumber became popular. “I wondered
why there couldn’t be an engineered
approach to composite products. Try-
ing to make a recyclable product
seemed like a good idea, and led us
to develop a new product category in
composite masonry,” he says.
The company’s products are made
from a combination of scrap tires and
recycled plastics. UV stability was
important so products would physi-
cally hold up after time and keep
their color. The company also tested
compressive strength and flexural
strength so the products wouldn’t
crack under intense weathering con-
ditions such as rain and ice. Finally,
chemical resistance was an important
factor, particularly against salt used
to remove snow as well as pool
chemicals.
Vander Woude says a major ad-
vantage composites have over con-
crete relates to shipping. “A concrete
plant can only ship its materials 100
to 150 miles before the economics
overwhelm the cost structure. Com-
posites can go nine times that dis-
tance,” he clarifies. Other problems
he points out with concrete include
difficulty in cutting, and slow, block
by block, labor intensive installation.

Like other composites manufac-
turers in infrastructure, VAST is
dogged by the liability-based, risk-
averse nature of the industry. “Any
new material, whether green or not,
has to go through a lot of work to
convince customers that its product
is truly going to look as great as they
say and will be a solid foundation,”
says Vander Woude.
The company counteracts this re-
sistance by beefing up its education
efforts. They communicate results of
lab testing and real-world installa-
tions in hopes of getting people over
a fear of using new building materi-
als. And Vander Woude thinks the
escalation of “green” importance
plays right into the company’s
hands. “It’s creating a counter-force
that compels people to look more at
new technologies, causing them to
reach out and embrace new things,”
he says.
Vander Woude adds that this em-
bracement is not only what the com-
pany needs to survive, but how the
composites industry can grow.
“We’re looking to change the way
that those products perform by low-
ering labor costs and refining distri-
bution methods. Anytime a material
breakthrough, it creates opportuni-
ties to do business.”
Florida native Corey Glasgow works on what he dubs “unique” projects, such as the fastest yachts, the lightest skiffs or the fastest racing boat. Three years ago, he and his friend Jessy Johnson started Compofab, an advanced epoxy composite marine manufacturer company based in Rockledge, Fla., with a group of close friends. Since then, they’ve traveled around the world, sharing their composites expertise with the boatbuilding industry.

“I got into composites ten years ago as a fluke,” he explains. “I was building houses with SIPs (structurally insulated panels) in Virginia, when Jessy told me about a 136-foot (41-meter)
superyacht based on aircraft technology, called the Adler Project, which a German industrialist was building with some guys from New Zealand. The group had been in Titusville, Fla., for a year working on the project and was ready to recruit more help. So, I moved back to my home state and jumped in with both feet.”

Bilge Rat to Novice
After two years of learning the ropes as an apprentice in the advanced composites marine industry, the project was finished and Glasgow branched out to learn more about composites manufacturing. “We had built the complete yacht structure with composites to keep it light. We made bulkheads from a nomex honeycomb core and carbon fiber, which at the time it was very unique, but has since become more mainstream,” he says. “But I wanted to refine the processes I’d learned, like multistep vacuum bagging to create lighter, stronger boats.”

Once the project was complete, Glasgow, Johnson and a few others from the project started building race boats for Callan Marine out of Brevard, Fla. “It was an amazingly innovative environment,” says Glasgow. “We built our own custom resin impregnators, solid-carbon floating pedestal molds for curing and the Miss Longlite—arguably the fastest prop driven catamaran ever.” After three years working on the Ms. Longlite speed boat, Glasgow was ready to move on. Johnson moved to Texas to work on aircraft parts, and Glasgow went to Sea Ray Yachts engineering department in Merritt Island, Fla.

From Novice to Owner
After two years working in separate locations, gaining more experience, the friends decided to start Compo-fab. Soon, the budding company was approached by Florida-based Vector-
works Marine, who they worked with on the Adler project. Vectorworks had been hired by J Franke Crane (JFCI), a composite contractor for Abu Dhabi Mar, based in Abu Dhabi, United Arab Emirates (UAE), to help retrofit a 462-foot (141-meter) Dutch war frigate into what he describes as a space-age private yacht for the ruler of Dubai, who would present it as gift for his son. “They got a deal on the boat, but it was all metal and they wanted the top to have breathtaking curves and shapes, which would have been difficult to do with aluminum or steel.”

In the UAE, there was only a small composite industry. “I only know of one race boat guy and he’s using polyester resins and very little vacuum bagging. In an effort to build the gigayacht, JFCI turned to the U.S. to manufacture the light-weight parts for the yacht,” explains Glasgow. “Faced with such a large task on a short deadline, Vectorworks needed people experienced in epoxy, peel-ply, infusion and vacuum bagging to help manufacture the four-story tall, 400-foot long composite shell,” explains Glasgow. “Vectorworks approached us to work with them as part of a team, which included Diab and Mystic Powerboats.”

Working together, the companies labored for a year, building 12 massive parts to ship to Abu Dhabi. “Because bulkheads were made in various locations, it was challenging to maintain consistent weight and stiffness,” explains Glasgow. “But we managed to keep things on track and once the outside structure mullions were manufactured (each piece measuring about 90 feet long and 40 feet wide), they were sent over in separate shell pieces on a barge and took a month to get there.” As part of a six-man team, Glasgow met the first four pieces in Abu Dhabi to finalize and set them.
From Owner to Gigayacht Expert

“When we arrived, we met our support team who hadn’t used vacuum bagging at all, but they learned really quickly,” he says. “However, we still had to overcome scheduling challenges because cargo would arrive late or get stuck in customs. In a place where composites supplies are rare, it was frustrating. Also, we discovered that acetone and other supplies are a security risk. But we managed through it by trying to keep ourselves busy with what we had around us. Because it wasn’t uncommon for things to be held up or lost, we would prep something else or cut cloth for a piece we wouldn’t be doing for another month. We just learned to take each day at a time, which sometimes meant going out of the air conditioned area to prep; there’s nothing else we could do.”

According to Glasgow there were more challenges than at customs. “Two bigger challenges for me were the weather and working schedule. I’ve done many epoxy projects in Florida, where I thought summers were hot. That was until I found myself setting up a make-shift advanced epoxy facility next to the Persian Gulf.” The team was given an empty parking lot with a series of stacked shipping containers and movable aluminum roof panels that allowed for an air conditioned work area. Finished shell pieces were then set on the existing metal frigate then the mullions were precisely connected with alternating carbon fiber layers, which became the structural skeleton. Once the shell pieces were placed, they were vacuum glued with a special resin into 3.5-inch wide steel channels that had been welded onto the hull.

“The climate was intense. Temperatures would soar so high, it would have been difficult to laminate anything fast enough,” says Glasgow. The team joked that the remaining epoxy parts enjoyed a full 16-hour post cure every day with the carbon mullion surface temperature reaching 180 F in direct sunlight. Daily temperatures were around 130 F with about 90 percent humidity. Plus there was a lot of sand and salt in the air—not the best for bonding composite parts. “We kept everything peel plied until we were ready to use it,” he says. “To make matters more interesting, half the trip fell on the Ramadan, the Muslim holy month that forbids drinking or eating anything during daytime hours. But we were lucky, we were in isolated areas so we could eat and drink in order to stay hydrated—as long as we were cautious.”

After eight long, hot weeks and about-to-expire visas, the group finally pulled off the last sandy peel ply, cleaned and readied the gigayacht, now made of approximately 50 percent composites, and said, “Shukran habibi” or thanks friends! Glasgow says he was glad to get home and now reserves bragging rights not only to working on another unique composites application, but also working in some of the hottest conditions on earth. In other words, never complain about being hot around him, or he’ll tell you exactly where to go… Abu Dhabi.
TURNING THE INDUSTRY UPSIDE DOWN...

Heat Processing Imaginarily

WISCONSIN OVEN

www.wisconsinoven.com
sales@wisconsinoven.com
262-642-3938

Contact us today about our Lifetime Warranty:

Lifetime warranty includes:

- High-limit instrument
- SCF, temperature controller and burner/heat exchanger elements
- SSR, including the recirculation blower, oven body, and all major components

Built to Last 8 Wisconsin Oven Warranty of a Lifetime

We guarantee it, and now we guarantee your investment for life. We realize you expect more, when you buy a Wisconsin Oven.
In a flailing economy, some boat manufacturers may wonder if there’s any power behind peak boating season? Ellen Hopkins, director of communications at the National Marine Manufacturers Association (NMMA), thinks so. “We felt the hits of the economy like every industry, and manufacturers coped by paying close attention to inventory and adjusting accordingly.

Last year, 80,000 new boats were produced and 150,000 new boats were sold. That means manufacturers used inventory from the previous year and sold a few more,” says Hopkins. “This year we expect to sell around 150,000 boats again. Our data from the first part of 2010 shows a slowing in sales decline of new powerboats. That equates to a 12 percent decrease compared to a decline of 35 percent during the first part of 2009, and is a good sign.”

However, while that equates to good news for the industry as a whole, it’s not exactly glowing for the composites industry. “Our reports show an improving trend in small aluminum boat sales,” she says. “These are boats that are typically purchased by first-time boaters for fishing and navigating small lakes and rivers, with the top 10 states for boat sales being Texas, Louisiana, Minnesota, Wisconsin, Michigan, Florida, Alabama, Arkansas, Illinois, and Georgia.”

Yet, data from the NMMA shows there is a clear area where composite boat manufacturers can focus. Data reveals that 75 percent of boaters have a household income of under $100,000 and 96 percent of powerboats on the water in 2009 were 26 feet or smaller, meaning boaters are primarily middle-class Americans operating small, trailerable boats. Add this to a recent survey where 95 percent of respondents said the current economy would not stop them from using boats this summer, with 23 percent stating they would go more this summer than last.

In fact, the Recreational Boating & Fishing Foundation (RBFF) is working with individual states to help market an increase of boating licenses. “Our push is to get people outdoors, kind of a tie-in with Michelle Obama’s No Child Left Inside campaign. Getting people boating not only helps the economy, but it helps protect the waters people are paying to play in,” says Heather Sieber, communications director at the RBFF. “And we’ve seen promise in these efforts. Just in the past year, license sales have gone up 4.7 percent, which is more than we’ve seen in the past 30 years. We attribute that to the new marketing efforts coupld with people’s desire to dial it back, enjoy a staycation and live a simpler life.” Hopkins adds, “If economic conditions continue to improve—including consumer confidence, a growing housing and employment market—we expect to see growth again in 2011-12.”

Pre-owned boat and engine sales totaled 11.5 billion in 2009, marking the first time pre-owned boat sales outpaced new boat sales since the National Marine Manufacturers Association began tracking the information in 1997.
Strong ocean breezes offer one of the best options for generating power from wind. Not to mention the largest concentration of people in the U.S. is located within the northeast corridor. In other words, people tend to cluster along coastlines. “Approximately 55 million people live, work and burn through high energy bills, all while untapped potential lies nearby,” says Jim Stover, vice president of global marketing and product management at renewable energy firm Northern Power Systems.

Yet people still argue that building an offshore turbine and anchoring it to the seafloor is time consuming and expensive, which is where composites come into play. “Wind turbines are tremendously complicated electromechanical machines that are exposed to both extreme weather and fatigue loads based on the variability of wind conditions,” says Stover. “The ability to more accurately model the impact of composites on structural integrity of wind turbines will be important to reducing cost, while maintaining high reliability and design life for future turbines.”

The U.S. has a goal of generating 20 percent of the nation’s electricity from wind energy by the year 2030—a potential boom for composite manufacturers. However, of several proposed offshore projects in the U.S., zero have been installed.

A group of Naval architects hopes to convince that offshore turbines are worth the investment. In the Journal of Renewable and Sustainable Energy, the group reports that wave tank testing data shows that floating platforms (similar to deepwater oil platforms) can support turbines up to 5 megawatts (MW). That’s pretty impressive considering 5 MW turbines have blades the size of a football field. And, according to Stover, “advances in composites may enable replacement of traditional steel and cast iron turbine components at a lower cost and weight for these parts,” he says.
Consulting and marketing company Flexi-Stix, LLC secured a patent for its process of incorporating pultrusion into a thermoplastic tube. The immediate result of its invention is a lightweight exercise tool, but the technology could soon permeate elsewhere.

President Gordon Brown previously co-invented bombproof wallpaper, which Berry Plastics is targeting for military and construction use. During the wallpaper-making process, he used an extruded thermoplastic urethane for the matrix rather than a typical epoxy resin. “It was sort of a novel approach, as we now have a way to put reinforcements into polyurethanes,” he says. “The industry needs to deliver cost-effective solutions to our customers through a combination of fibers and resins, and we believe our way was unique in accomplishing that.”

Using that same thought process, Brown focused on another way to give extruded thermoplastics additional strength and stiffness for better performance properties. He combined an extruded thermoplastic tube such as polyvinyl chloride (PVC) with a rectangular pultruded composite (materials such as fiberglass, reinforced vinyl ester, epoxy, carbon, or aramid). The pultruded composite is slipped inside the tube, after which closures are placed on the end to stop the fiberglass from falling out, effectively creating a flexible pole.

“Straight extruded PVC is flexible, but too much so for most applications,” says Brown. “All pultruded round tubes are too stiff, and aluminum steel and metal are very rigid poles. This...
process offers a way to take low-cost extruded thermoplastics and make them stronger.

The genesis for the product’s creation came while Brown worked for Strongwell. In the mid-1980s, the company was approached by Universal Gym Equipment to develop a product to use composites for bending resistance. “We came up with a product that was developed and marketed, but we took a pultruded shape, and ran it through an extruder and put a tight covering of thermoset rubber over it. That gave it a round shape, but there were concerns the fiberglass would splinter in people’s hands,” says Brown. Universal wanted something over the outside of the fiberglass to prevent that, but the product and process ended up being too expensive at the time, so that project was abandoned.

However, that concept never fully left Brown’s mind, and over 15 years later he saw a hollow piece of PVC tube in a hardware store. “I simply wondered what would happen if I put a pultruded piece of fiberglass down the center of that tube. In all of our thinking, no one ever thought to take an extruded thermoplastic tube and put fiberglass inside it,” he notes. That was the breakthrough he needed, and he immediately worked on patenting the product as a lower-cost, more effective exercise tool.

Currently, the tube is primarily used in the exercise industry, sold under the name Body Bar Flex. The product is used to improve balance, flexibility and resistance training. Brown compares his product to Bowflex bars, which are comprised of solid-extruded Nylon. He believes that added pultruded fiberglass results in greater bending stiffness. “I also noticed that it would bend around the major axis wherever your hand is positioned, which makes it friendly for a customer to use because they can place their hands anywhere and the tube is tough,” he says.

Though workouts were the initial focus of the product, Brown is trying to diversify into a variety of markets. He believes his product could be used for such applications as flag poles, walking sticks, rake handles and fence posts. “I have opportunities to consult with companies, and I always look for somewhere to think outside the box,” he says.

When you want your product to stand out in a crowd, start with a material that stands out. Introducing Barracuda®, a fabric with the looks of moldable steel and the strong, durable, lightweight characteristics of traditional high-performance fabrics. Together, these attributes provide a unique combination of beauty and strength that will transform any composite product into something that dares to be different.

Learn more about Barracuda® at barracuda-bgf.com or call 1-800-476-4845. Barracuda is a registered trademark of BGF Industries, Inc.
Converting products from traditional materials to composites is one of the most effective ways to grow the composites market. However, composite attributes such as design flexibility, durability, cost, weight and performance advantages alone will not grow the industry; end users must also be aware of these products.

Ashland Performance Materials, Dublin, Ohio, recognized an opportunity and developed a strategy to increase the use of composites in the building and construction segment. Their plan focuses on raising awareness among building and construction professionals. The plan specifically targets the growing interest in "green" building materials driven by sustainable building initiatives such as the USGBC’s LEED program.

Ashland is preparing a composites industry showcase to be launched at the Greenbuild show in Chicago, Nov. 16-18, 2010. Greenbuild is the largest green building materials show in North America, drawing as many as 30,000 attendees who are involved in specifying, purchasing and installing green building products.

The showcase is called CompositeBuild.com and includes a 20’ x 30’ booth and a website dedicated to composites in construction. The display will include the variety of ways that composites can be used in residential and commercial building. The focus is on the environmentally considerate attributes of these materials such as recycled content or rapidly renewable content, insulation value, durability and Greenguard® certification. The website is designed to provide an avenue for people to link to composites material fabricators long after the Greenbuild show has ended.

“We have been looking for a cost-effective way to reach a new audience to grow our industry. At the Greenbuild show many of the construction professionals in attendance will not be familiar with the advantages of composites. This is a great opportunity, so we’re going for it.” As noted above, both the booth and website will be called CompositeBuild.com. There will be little reference to Ashland. “Our goal is to present a unified industry presence to grow the market for us all,” explains Mike Wallenhorst, director of product management, Ashland Performance Materials.

Ashland is opening this effort to fabricators of composite building materials and is allowing the fabricators or their distributors to be listed on the CompositeBuild.com website at no charge. “The site will be most valuable to the end user if there are many choices, so we are continuing to look for quality composite building and construction products, especially those with a green angle, to link to the CompositeBuild.com website.” says Bob Moffit, product manager, Ashland Performance Materials, who is coordinating the booth and website efforts.

Composite fabricators who are interested in learning more or wish to be connected to CompositeBuild.com should contact Bob Moffit at rlmoffit@ashland.com.

Ashland Performance Materials is a commercial unity of Ashland Inc., (NYSE: ASH).

*Trademark owned by a third party.
Energize your business with 30,000 new prospects!

Feature your composite building products on CompositeBuild.com.

...then join us in November at Greenbuild, the largest "green" building materials show in North America, in our CompositeBuild.com booth. CompositeBuild.com and its associated website will enable architects, designers and builders to connect with YOU.

Come 'grow' with us!

At Ashland, we are committed to growing the composites industry. If you produce or supply a composite material that innovative builders would want to use, contact Ashland to link your product into CompositeBuild.com. For more information, contact Bob Moffit at rmoffit@ashland.com.
Composite Bridges Going Forward
Five things you need to know about the future of composites in bridges

By A. Mike Shuler

Composites professionals have been working for almost fifteen years to attain wider adoption of products used for bridge applications by departments of transportation and civil engineers. So where do things currently stand? Here’s what you need to know:

#1: Knowledge and Enthusiasm for Composites Is Growing
More than 1,500 people attended the International Bridge Conference in Pittsburgh in June. Members of the Transportation Structures Council, a part of the American Composites Manufacturers Association (ACMA), exhibited at the conference. The group’s larger aim is to obtain language in the transportation bill that promotes the specification, design and construction of long-life bridges and other highway structures.

According to John Busel, director of the Composites Growth Initiative for ACMA, there were representatives from 35 departments of transportation (DOT) and 12 other agencies and municipalities focused on bridge product specification. At past conferences, attendees wouldn’t know anything about composites and would ask very broad questions, says Busel.

This year, the inquiries were more detailed, and TSC members talked about what composites could do and how they could be used in specific

HC Bridge Company’s hybrid-composite beam emphasizes cooperation between composites, steel and concrete.
situations. “That tells me that FRP is becoming more mainstream and that people understand that it’s one of the main materials that can be used for infrastructure,” Busel notes.

However, interest and enthusiasm have yet to become business. Dan Richards, CEO of ZellComp, says he’s been getting a lot of calls about his pultruded FRP bridge deck system, but it’s not enough. “There’s no money in the state DOTs, so the funds just aren’t there for infrastructure at the moment,” he says.

#2: Composites Should Cooperate with Other Materials
Dan Witcher, corporate chief structural engineer for Strongwell, thinks the best strategy for composites is cooperation with other materials. “Rather than be a stand-alone component in some of these infrastructure systems, we should aim for integration into the construction system as a whole,” he says. FRP rebar reinforcement in conventional concrete, for example, is about 10 percent more expensive than concrete alone, but effectively addresses weight, corrosion and deterioration challenges. “For that cost, it’s practical to use this material, which has a much better life cycle,” Witcher adds.

“The composite people might not like to hear this, but I always emphasize the fact that I’m working with a hybrid member,” says John Hillman, president of HC Bridge Company. The product in question is a hybrid-composite beam comprised of fiberglass, steel and concrete. While 95 percent of the strength and stiffness comes from concrete and steel, fiberglass still serves an important function. It is a means of placing the concrete and anchoring the tension reinforcement, but it also transfers the shear loads and provides the corrosion barrier necessary to give the structure longevity.

Hillman thinks manufacturers have to think differently. “There’s a tendency when we’re focused on one aspect of an industry to think there’s only one solution, but a lot of the great advances in technology are facilitated by cross-pollination between two industries. I view composites in the same way; they have tremendous properties, but not the perfect properties for everything we need to do. Marrying that with conventional materials can compensate for the deficiencies of FRP and exploit its good characteristics,” he says.

#3: Opportunities Exist Beyond Bridge Decks
Perhaps the most prominent bridge component is the deck – the transportation foundation of the structure. However, composites may not yet be equipped for wide usage in this application. Paul Liles, state bridge engineer for Georgia DOT and chairman of AASHTO’s T6 FRP committee, says heavy truck usages pounds composites. “Heavy truck traffic is very tough on structures. With most building products, you analyze it and it may look fine, but trucks seem to pound it apart. Composite decks suffer from such maladies as splitting along layers of fibers and delaminated overlays. It’s one of those things where you go through the equations and everything looks fine, but there are other factors to consider,” he says.

Still, that doesn’t mean composites don’t have any opportunities in bridges. Pedestrian bridge systems, which are smaller and designed for people to walk across, are incorporating more composites. “The loads for those are less, and lighter systems are needed due to such variables as access to a construction site,” says Witcher.

FRP structural strengthening systems (often called wraps) and repairs are also opportunities. “When a contractor damages a beam, repairing with carbon fiber is the most cost-effective solution for them,” says Liles. Some questions linger about how long the repair will last, though. “The industry tells us different amounts, from 15 to 25 years for exposed conditions, and we don’t know. However, it’s been out for 10 to 15 years and we’ve seen no reports of taking it down,” adds Liles.

#4: University Research Helps the Composites Cause
West Virginia University (WVU) was one of the first schools to research composites in bridge applications and apply that knowledge to real-world applications. Dr. Hota GangaRao, engineering professor at WVU, has helped implement FRP in wraps and decks in approximately 15 bridges in four states since he started researching the area in 1987.

“Education certainly hasn’t hurt,” GangaRao says. He has helped advance industry use of composites

(“Composite Bridges Going forward” continues on p. 38)
COMPOSITES 2011 connects the entire composites industry to provide you the broadest range of networking, vendors and education — face-to-face and under one roof. Find everything from basic materials to cutting-edge, high-tech products and equipment to help you grow and remain competitive in traditional and emerging markets. Plus, learn with in-depth education and demonstrations focusing on real world applications of materials, processes and innovations.

You’re invited to connect, learn and grow with the composites industry at COMPOSITES 2011. Plan to Attend!
The biggest problem with wind turbines is that there aren’t enough of them. That and “They’re not perfect—yet,” says Angelika Pullen, communications director of the Global Wind Energy Council (GWEC).

GWEC explains that breakthroughs in efficiency, quality, reliability and cost are important to achieving the perfect turbines. “We’re watching developments in the use of different materials, including carbon fiber in blades, materials other than steel for towers, strengthened nacelle covers and lighting protection; all of which are designed to provide an advantage in certain situations,” she says. “These are where the advances and tradeoffs are being made at the moment, and they will be tested in the field and in the marketplace.”

So what breakthroughs is GWEC looking forward to? “We’re obviously interested in the new generation of 5+ MW machines and how they perform,” says Pullen. “I believe the 5+ megawatt (MW) machines will be the workhorses in the offshore industry, which means they will be critical for the development of offshore in Europe, China and eventually the U.S.”

According to Pullen, “it’s also noteworthy to watch the development of a whole variety of new drive train options such as direct drives, permanent magnet and fully synchronous generators.” says Pullen. “Direct drive machines reduce the number of moving parts in a turbine, but they have their own problems. Time, and the market will determine who wins, per se.”

Below are just some of the up-and-coming turbines hoping to win over the marketplace and earn the title of ‘crown jewel’ of the wind turbine industry.
<table>
<thead>
<tr>
<th>Turbine Type</th>
<th>Description</th>
<th>Type</th>
<th>Company HQ Location</th>
<th>R&amp;D Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bumblebee Turbine</td>
<td>The XBEE Alpha, coined the Bumblebee turbine, is a small wind turbine modeled after the wing movement of bumblebees. It has a 19-foot rotor diameter “wingspan,” complete with two wing turbines, which imitate the movement of bees. It uses a permanent magnet alternator and can be mounted both vertically and horizontally.</td>
<td>Land (home/small business)</td>
<td>Green Wavelength Santa Monica, Calif.</td>
<td>Currently in Phase 2 through December 2010, includes optimized wing design and center of gravity, assembly of a beta prototype complete with field tests and data analyses. The final phase, Phase 3, will include finalizing design for manufacturing, material supplier selection and marketing.</td>
</tr>
<tr>
<td>Honeywell WT-5600</td>
<td>Resembling an over-sized unicycle, this 10-blade turbine is small and compact. Named one of the “10 most brilliant products of 2009,” by Popular Mechanics magazine, it can be installed on a separate pole, tower or roof. And due to its configuration, it doesn’t need to be positioned away from trees or other objects. Another plus for home owners is the potential for electricity generation. It is designed to generate electricity with wind speeds as little as 2 mph (other residential turbines require at least 7 mph).</td>
<td>Land (home)</td>
<td>Windtronics Muskegon, Mich.</td>
<td>Completed in two years</td>
</tr>
<tr>
<td>Sway Floater</td>
<td>The floating tow is submerged to a depth sufficient to ensure stability and limit the motions of the system and is anchored to the seabed with a steel pipe known as an anchor leg (the leg can be adjusted to the water depth at the site.) This system allows a large-scale wind turbine to be placed on top of the tower with the rotor placed downwind and the nacelle rigidly fixed to the tower. The rotor tilt angle can be adjusted for optimum tilt angle for wind alignment without risk of blades clashing with the tower.</td>
<td>Offshore</td>
<td>Sway Rådal, Norway</td>
<td>After ten years of R&amp;D, Sway finished its conceptual phase and is currently undergoing detailed engineering.</td>
</tr>
<tr>
<td>Fuller Wind Turbine</td>
<td>Based on a patent issued to Tesla in 1913, the Fuller wind turbine is a bladeless turbine system with a screened inlet and outlet. The turbine-driveshaft is the only rotating part, which cuts down on maintenance.</td>
<td>Land</td>
<td>Solar Aero Research Greenville, N.H.</td>
<td>7 years (2002-2009)</td>
</tr>
<tr>
<td>MW Possible</td>
<td>Material Used</td>
<td>Turbine Dimension</td>
<td>Launch Date</td>
<td>Time To Manufacture</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>1 kW</td>
<td>60 percent steel, 10 percent aluminum, 30 percent fiberglass composite. Casings, wing blades, tail fins: fiberglass or carbon composite. Wing spars: aluminum Gearing: steel</td>
<td>Height: 19 feet  Weight: 300 pounds</td>
<td>January 2011</td>
<td>4-6 weeks</td>
</tr>
<tr>
<td>2.2 Kilowatts (2,752 KW per year)</td>
<td>Shroud, stators: nylon glass-filled composite Support structure: anodized aluminum</td>
<td>6 feet in diameter  Weight: 170 pounds</td>
<td>Early September 2010</td>
<td>5 minutes</td>
</tr>
<tr>
<td>5 to 10 MW</td>
<td>Tower, tension leg, anchor and central components: steel Blades, nacelle house: composites  * other materials other than steel and metal alloys are being considered for optimization.</td>
<td>Height: 295 feet, 14-30 feet in diameter. Sway plans to install a 1:7 model in 2011 and launch a full scale prototype the end of 2011.</td>
<td>No information available</td>
<td>Deep sea water with depths between 300 - 1,300 feet</td>
</tr>
<tr>
<td>1-1.5 MW</td>
<td>All composite with the exception of the magnetic support and drivestaff alignment bearings.</td>
<td>Height: 8 feet  Weight: unknown</td>
<td>Late 2010</td>
<td>Estimated: 200 man hours</td>
</tr>
</tbody>
</table>
### Can You Answer These Questions about Closed Molding?

1. What are the primary means for controlling the resin flow and fill rate?
2. On average, how many parts does it take to recuperate the cost of the silicone bag used in CCBM?
3. What is the purpose of the vacuum bowl assembly?
4. What is the function of a flange cavity in the LRTM process?

**Certified Composites Technicians (CCTs) can.**

Learn more about the American Composites Manufacturers Association’s new CCT-VIP and CCT-LRTM programs *(and see how you scored)* at [www.compositescertification.org](http://www.compositescertification.org)

---

<table>
<thead>
<tr>
<th>Turbine Type</th>
<th>Description</th>
<th>Type</th>
<th>Company HQ Location</th>
<th>R&amp;D Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carousel Wind Powered Turbine Engine</td>
<td>The carousel model takes advantage of Kinetic Energy technology. It is a vertical-axis turbine generator, with no external parts, that produces electrical power within a self-contained structure.</td>
<td>Land</td>
<td>Envision Corporation, Calgary, Canada</td>
<td>Prototype design #4: ready to build small testing model for wind tunnel testing sequences. Final design engineering and first field installations required.</td>
</tr>
<tr>
<td>MW Possible</td>
<td>Material Used</td>
<td>Turbine Dimension</td>
<td>Launch Date</td>
<td>Time To Manufacture</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------</td>
<td>-------------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>5+</td>
<td>40 percent steel, 40 percent concrete and 20 percent composites.</td>
<td>Predicted height: 8 feet to 200 feet</td>
<td>Scheduled for June 2011</td>
<td>Currently unknown. In need of concrete, structural and composites expertise.</td>
</tr>
</tbody>
</table>
I thought I would send periodic updates on the Composite Merit Badge tent at the Boy Scouts of America National Jamboree, which is celebrating 100 years. Thanks to you who donated time or materials to this event.

Our idea was to run two projects to help scouts complete their merit badge. However, each of the volunteers decided to BE PREPARED with a backup plan. Now we have six projects the scouts can choose from:

- Jamboree signage
- Jambo key fobs
- Cultured marble BSA oath medallion
- Cultured marble BSA "fleur-de-lis, floor-de-lieu, logo"
- Rocket nose cone (with free rocket body)
- Rocket fins (also with free rocket body)

It started a little slow (only six scouts came to our first session). So we gave each scout a pultruded tool handle donated by Teel Plastics. If you call the tool handle an indestructible composite “hiking stick,” that changes their whole impression.

Word got around and the next crowd of boys was too big to manage effectively. We had to ration the “hiking sticks” and institute a sign-up sheet to keep the number of scouts to a manageable level.

One advantage of the Composite Merit Badge is that it can be completed in two hours, all requirements are fulfilled, and we make “cool” stuff.

Thanks to our volunteers: Jim Kotch (Composites USA); Mike Bell (Mohawk Industries); Dennis Fink (Syrgis) and Jim Scholler (who unfortunately was unable to attend).
It has been incredibly hot and humid. How hot you ask?
• So hot we have wet t-shirts without entering a contest. If you know the four of us, don’t try to visualize that.
• So hot you can almost smell our BO over the styrene. Whew!!
• So hot we have a third filler for all of our projects…road dust.
• So hot we lost two laminating rollers the first day. (That’s true.)
• So hot the scouts from Alaska carry squirt bottles to keep their heads and shirts wet. (That’s true too.)

Despite our edge-of-the-seat presentations the heat takes its toll on some of the scouts. We force all scouts to take a sip of ice water between breaks. We also pass out $1 off coupons for use at the Trading Post for scouts that hydrate without us asking.

As Composite Merit Badge Leaders we’ve learned a few things:
1. Despite the popularity of Plasticolors phosphorescent pigment, letting scouts use pigment is not one of our better ideas.
2. Mixing hollow glass microspheres in a breeze with sweaty arms makes me look like Frosty the Snowman. Rinsing with ice water was no fun despite the heat.
3. Composite walking sticks have a second use—preventing our tents from collapsing as we emptied “lakes” of water trapped above us during a monster thunder storm.
4. We picked up additional composite project ideas as Composite Merit Badge councilors from other parts of the country “audited” our class.

We’ve had full attendance every day. In fact, we have scouts that want to attend so badly that we have a stand-by list a full day in advance. It’s sad to turn anyone away but the main goal is safety, and three leaders can only “herd so many cats.”

It’s remarkable to see the number of Eagle Scouts who haven’t stopped pushing forward. Many of them are now earning silver and gold palms. If they learned nothing else, they know that resin is sticky. Thanks Ashland. Thanks Interplastic.

We have been told by nearly every visiting councilor (Composites or not) that we have the “coolest” merit badge on the midway. Each scout walks away with something he made.
Q&A: Technical Knowledge Sells Composites, says Award-Winning Manufacturer
John Hillman, president of HC Bridge Company, developed the hybrid-composite beam (HCB), which is a bridge beam using a combination of fiberglass, steel and concrete. He was recently named 2010 Innovator of the Year by Engineering News-Record.

Q&A: Boeing Believes In, But Not Sold on, Composites
Alan G. Miller is the director of technology requirements and incorporation for Boeing Commercial Airlines – Product Development. Miller oversees the development of multi-platform airplane and services requirements, which focuses on the technology investments for Boeing across all technical disciplines.

Q&A: Which Automakers Are Most Likely to Use Composites?
David Stewart has worked in the automotive industry for more than 20 years, taking technology out of labs and applying it to mass production environments. He owns a research firm, Stewart Automotive Research, and was just named chief executive of Zoltek Automotive.

Q&A: Wind Turbines No Longer a Seller’s Market, Says one VP
Jim Stover is vice president of Global Marketing and Product Management of Northern Power Systems. The Company began in the early 1970s during the first major oil crisis in the U.S. Now it is the oldest renewable energy company within the U.S.

Q&A: Is Your State Ahead of the Composites Curve?
Louis N. Triandafilou is the senior structural engineer for the Federal Highway Administration (FHWA) and acts as a liaison between the FHWA and the composites industry. In addition to working with AASHTO’s subcommittee on bridges, he also attends and hosts conferences to keep FRP in the forefront of bridge applications.

To read the interviews with these and other leading members of the composites industry, visit www.compositesmanufacturingblog.com and click on “Q&A Interviews.”
There is no association that represents the legislative, regulatory and growth initiatives of the composites industry more than ACMA. We’re your first-line of defense against unreasonable regulation, and we’re your best offense when it comes to developing standards that will promote adoption among end users. Scan the next few pages, and you’ll read about just some of ACMA’s ongoing activities.

Despite our recent successes, especially with building a grassroots political foundation, our strength depends on industry involvement and support. If you haven’t joined or renewed your ACMA membership this year, please reconsider. If you’re a current member but aren’t actively involved in our committees and events, now’s the time to start. We need your active participation in order to grow as an industry.

Tom Dobbins, CAE

ACMA Targets Key Legislators with Visits
ACMA has identified a number of Senators and Representatives whose support will be critical in gaining deferral of the National Toxicology Program’s (NTP) final styrene decision and reform of the NTP review process. These key Members of Congress represent the following states: Arkansas, Indiana, Iowa, Nevada, North Carolina, Ohio, Tennessee, and Washington; and these Congressional districts: AL-02, AZ-01, FL-24, IL-03, IL-08, IL-11, IN-02, IN-08, KS-03, ME-02, NC-11, OR-05, PA-03, PA-04, PA-10, PA-17, and TX-17.

ACMA members with operations in these states and districts are asked to participate in a September 14-15 Washington D.C. Styrene Industry Fly-In. For more information, email John Schweitzer, ACMA’s senior director of government affairs, at jschweitzer@acmanet.org.

Styrene Users Meet with Calif. Legislators
Over 25 industry representatives visited the offices of more than 35 California State Senators and Assemblypersons as part of an August 3 Styrene Industry Sacramento Legislative Day. The industry asked for support for reform by the Governor’s office of the Cal-EPA process for assessing chemical health hazards. Cal-EPA, as the result of a partial and biased review of the available data, has proposed to regulate styrene as a carcinogen.

OSHA “Reform” Bill Held from Vote Following Industry Education Effort
ACMA heavily contributed to a campaign by the Coalition for Workplace safety to educate members of the U.S. House of Representatives regarding the negative impacts of legislation that would have dramatically increased the fines and penalties that OSHA can levy against employers, to include felony criminal charges against owners and managers in cases where workers are seriously injured, and would have given OSHA inspectors the authority to shut down operations without due notice or process.

As a result of the CWS education effort, the legislation wasn’t brought to the House floor for a vote before the July 30 adjournment, as the House Education and Labor Committee leadership had wanted.

Revamped CCT Open Molding Program Now Available
The original Certified Composite Technician (CCT) program—Open Molding, has been updated to reflect changes in processes and best practices, and has been moved to a convenient two-book system. With one textbook dedicated to basic composites material, and the other to open molding technology, studying for your CCT has never been more.

Show Your Commitment to ACMA
As a valued ACMA member, you now have the opportunity to use the “ACMA Member” logo on your company’s website, letterhead, advertisements, and other promotional materials as part of ACMA’s new Member Logo Program. Download a logo today, at www.acmanet.org/membership, and show your customers your commitment to the composites industry.
Utility Pole Committee Reaches out to Electric Co-ops

CGI’s new Utility and Communications Structures Working Group (UCS-WG) committee revised and updated a document used by the USDA Rural Utilities Service to make it easier for administrators in rural electric co-ops to apply for funds and authorization to use FRP poles. This would replace a current more cumbersome document.

ACMA was invited by the Electrical Transmission Specifications committee of National Rural Electric Cooperative Association (NRECA) to brief the committee on the benefits of using composites technology for utilities. This committee will be critical in developing a specification for FRP poles and ACMA hopes to gain trust and credibility with this end-user organization as the UCS-WG develops draft specifications for review and consideration. For more information, contact John Busel, ACMA’s director of the Composites Growth Initiative, at jbusel@acmanet.org.

Exhibitors Receive More than Space at COMPOSITES

Exhibitors at COMPOSITES 2011 receive complimentary services and tools they need to make the most of their investment, including exhibit hall passes for customers, attendee lists, how-to webinars and marketing tools. Find out more and reserve your exhibit space today by visiting www.acma show.org or contacting Ryan Brown, ACMA’s exhibit and membership sales manager at rbrown@acmanet.org.
Inside ICPA

ICPA Spring Multi-Regional a Success

The ICPA Board hosted a Multi-Regional Workshop and Demonstrations on June 24-25 in Dublin, Ohio, on the campus of Ashland Performance Materials. More than 80 cast polymer industry representatives from 22 states attended this event and participated in 12 educational sessions covering management and production issues and themes, and five general and commercial demonstrations. Dinner speaker Don Bellock, director of composites from Ashland, provided an overview of the residential market with a sneak peek of what the future could hold.

ICPA thanks Ashland for providing the venue, food, and drinks for the workshops, and Heritage Marble of Ohio who opened their shop to the multi-regional attendees to watch demonstrations that included: urethane and silicone molding, veining techniques, spray gun procedures, and polymer concrete processing. Commercial demonstrations showed the newest fillers and spray granite to enhance cast polymer products. This event could not have taken place without the support of the many material suppliers who exhibited and sponsored the demonstrations. Thanks also to Jack Simmon, ACS International, who served as the coordinator for the demonstrations. Thanks also to Laura Gigas, Ashland, who coordinated all the events for the workshops, and Steve Leather, Heritage Marble of Ohio, who coordinated the demonstrations at his plant. For more information on this event, contact ICPA Staff Liaison John Busel at jbusel@acmanet.org.

New ICPA Board of Advisors

As a result of the recent Board election, ICPA welcomes two new members to the ICPA Board of Advisors for FY 2010-2011, which started on July 1. The new Supplier Directors on the Board are: Craig Abner, Advanced Plastics, Inc.; and Daryl Francis, Interplastic Corporation. Departing Board members are: Richard Higgins, Secretary (HK Research) and Manufacturing Directors Bob Kattel (CMP Group Inc.) and Laura Schmidt (Custom Marble Inc.).
through seminars, shop courses and additional field implementation. “Even providing a booklet to undergraduate students in basic terms, not complicated forethought, can help aid their understanding,” he adds.

The research keeps coming. One notable project is occurring on the campus of University of Nevada-Reno (UNR). Researchers are testing the impact of composites in bridge structures under earthquake conditions.

Said Saiidi, engineering professor at UNR, says this kind of testing helps researchers understand how the entire system works, which adds to its credibility. He used glass fiber composite columns filled with a carbon tube, and simulated intense back-and-forth movement on the structure to assess how the materials would hold up after a tremor.

The team noticed immediately that the materials did not suffer any external stress damage. “The composites stayed strong after the damage, so you would not have to shut down the bridge,” says Saiidi. The biggest factor, which will take time to measure effectively, is the state of the internal stress damage. Seeing the specific results of those internal stresses from an earthquake could be a major way to make engineers comfortable using composites. “There is no database to tell them that it looks good on the inside. Time and data are needed, especially as engineers’ feelings are evolving and improving and the cost of composites has also become competitive,” says Saiidi.

Saidi thinks discovering this information could benefit the industry. “We’ve been using concrete and steel for decades, so the comfort level is high. Composites are relatively new, and because of the large liability involved in projects like bridges, engineers are very cautious and need more time to feel comfortable. On top of the work done by ISIS Canada, a network created to provide civil engineers with better ways to build, repair and monitor structures using high-strength FRPs, this will aid in increasing the legitimacy of composites,” he says.

#5: The Near-Future Holds Promise

Despite these developments, composites remain at a disadvantage because they don’t have an established design standard. Established standards for traditional materials have been in place for decades, which makes it tough for composites to compete.

“The standards are important, because they’re what an engineer goes to as a means of designing structures,” says Dan Witcher of Strongwell. And according to him, these complete FRP standards are 90 percent close to completion.

Witcher is the chairman of a committee working with the American Society for Civil Engineers (ASCE) on this issue. FRP manufacturers have raised funds and pushed for this change for several years, but it wasn’t until 2007 that progress started to occur. The industry contracted with ASCE to develop a pre-standard that would cover LRFD (load resistant factor design) design of bridge structures using pultruded FRP shapes.

That pre-standard is in place, and will go through the ASCE balloting committee in the fall to become a full standard, at which point it can be used by practicing engineers working with FRP materials. The standards will also go through a peer review, and Witcher anticipates the process being completed by 2013.

When that happens, the impact could be immediate. “Currently, engineering firms and construction documents require FRP structures to be designed by the manufacturer. Once that standard is out there, the engineer has a legal means to do his own design,” says Witcher. He also notes that published standards could also lead to immediate change in academia. “Schools could use those specific guidelines to train students early into working with composites.”

In the meantime, groups such as the TSC are focusing their efforts on Congress and the Transportation Bill. DOTs can start a ripple effect by committing to suppliers of products on projects that will be built if they’re infused with the proper funding, which will then result in contractors getting their crews involved. If all goes well, these changes will put composites on a level playing field with other materials in infrastructure.
Advertiser Index

3A 5 Composites Australia 18 Nida Core Corp. 19
AOC Back cover Composites One Inside front cover Plascore 15
Ashland 22-23, Inside back cover Elliott Company of Indianapolis 11 Precision Quincy 13
Barracuda-BGF 21 Owens Corning 9 PRO-SET 10
Bedford Reinforced Plastics 12 McClean Anderson 31 Saertex 7
CCP 3 Mehtech Composites, Inc. 14 Wisconsin Oven 17

Composites Australia

Nida Core Corp.

Plascore

Precision Quincy

PRO-SET

Saertex

Wisconsin Oven
No matter the decade or the economic conditions, employee satisfaction and motivation are keys to a company’s success. CEOs, presidents and human resources departments pore over books on how to maintain employee morale and boost productivity. But how exactly do they implement what they learn? Below are ways three industry leaders boost what they consider one of their biggest assets—employees.

How do you keep employees motivated?

**Doug Caudle**  
President, Piedmont Fiberglass  
Taylorsville, N.C.

It's important to recruit your people every day. Companies constantly think of ways to attract people, but not on what would make them want to stay. It’s a manager’s responsibility to find what motivates his or her people, which is a very individual thing. Constantly ask your employees, “What keeps you at a job? What do you want from this job? What do you want from your career?” Don’t be afraid of these conversations!

**Kevin Horne**  
President, V2 Composites Inc.  
Auburn, Ala.

I think motivating people is easier when your management style is open and honest. People need to be heard and to hear the truth from their leadership. It’s amazing how hard people work when they understand the mission—both the risks and the rewards.

**Chris Frigo**  
President, Forte Composites  
De Pere, Wis.

Motivation and priorities are a very individual thing. Employers always think it’s about the money. In employee surveys I’ve read, money is important, but it’s not what keeps people. Retention is highest when people feel valued and are given challenges. It’s important to acknowledge someone’s contribution either personally or publically. Say thank you. Yes it’s their job, but it doesn’t mean they don’t want to hear it.

*To read more on how these and other composite leaders motivate their employees, visit www.compositesmanufacturingblog.com*
You don’t have to sacrifice performance to go “green”

Ashland Distribution makes it easy for you!

Get the products, processes and technology you need to improve productivity, meet emissions standards and reduce waste with cost-competitive “green” solutions:

- Sprayomer® elastomers featuring reusable, net shape, spray-on infusion bag technology to enhance your closed molding operation
- ACRASTRIP® composite resin remover, the only DfE Division of U.S. EPA-endorsed cleaning solvent for thermoset resin systems that is non-flammable and HAP-free and a 100% replacement for acetone.
- Envirez® resin, a performance enhancing, bio-based resin system using renewable resources for open and closed molding applications.
- Polymat® pre-formable, closed mold reinforcement, offers glass reinforcement that easily conforms to complex shapes.

And, the Ashland “Green” Connection, can help determine closed molding options for you, by developing and implementing solutions through our technology partners:

- SR Composites: specializing in processes and apparatus for production VARTM molding
- JHM Technologies: specializing in LRTM training schools, RTM equipment, molds and consulting
- New Boston RTM: specializing in RTM tooling and production
- Scott & Fyfe, Ltd.: specializing in innovative textiles and technology

Call Ashland Distribution today at 1.800.531.7106 or e-mail us at greenconnection@ashland.com

Ashland Distribution has been providing access to the composites industry’s leading suppliers for more than 20 years, assisting with resin, gelcoat, reinforcement, catalyst, core, adhesive and other product and business support needs. We are committed to long-term partnerships, offering a highly experienced support team, advanced inventory management systems, ISO certification and the most comprehensive North American distribution service network in the industry.
EcoTek™ is for the only planet we have.

The Earth is getting a lot more attention these days, and composite and cast polymer manufacturers are taking notice by turning to “greener” solutions. To help manufacturers become better environmental stewards and market to the growing green marketplace, AOC introduces revolutionary, new EcoTek™ Green Technologies.

EcoTek materials for all major processes and market sectors are engineered for seamless transition. Processing characteristics and mechanical properties of EcoTek unsaturated polyesters and vinyl esters are similar to or better than those of traditional materials. The difference is in the EcoTek advantage of renewable content, recycled content and/or styrene-free technologies.

EcoTek puts more green into what you make. To get started, e-mail Fletcher Lindberg at flindberg@aoc-resins.com, phone him at 901-854-2800 or go to www.green-resins.com